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| 10/556,666 | 11/10/2005 | Son-Ha Giang | Serie 6288 | 8573 |
| 40583 | 7590 | 07/20/2009 | EXAMINER | |
| AIR LIQUIDE Intellectual Property 2700 POST OAK BOULEVARD, SUITE 1800 HOUSTON, TX 77056 | | | SAVANI, AVINASH A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3749 | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/556,666

Applicant(s)

GIANG ET AL.

Examiner

AVINASH SAVANI

Art Unit

3749

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28, 30, 31 and 34-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28, 30, 31 and 34-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2008 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. The following action is in response to the applicant's Request for Continued Examination dated 5/6/2009, that was in response to the Office action dated 1/6/2009. Claims 28, 30, 31 and 34-38 are pending, claims 28, 30 and 31 have been amended, while claim 29 has been canceled and claims 34-38 are considered new.

Response to Arguments

2. Applicant's arguments with respect to claims 28, 30 and 31 have been considered but are moot in view of the new ground(s) of rejection. In light of the newly found prior art, a 35 U.S.C. 103(a) obviousness rejection has been made.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the coaxial feature of the ducts of claim 37 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 37 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 37 is indefinite because of the limitation "located back from said...". Since no drawing is used to illustrate this element, the claim will be interpreted to mean that both are in the least axial of each other.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 28, 30, 34, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over latrides et al [5743723], further in view of Baysinger [4034911].

8. With respect to claim 28, Iatrides et al discloses an apparatus which may be used as a combustion system [see FIG 3] said apparatus comprising: a) an oxyfuel burner (10); b) a first duct adapted to feed said burner with fuel (14); c) a second duct adapted to feed said burner with an oxidizer comprising oxygen and an additional gas (12); d) an oxygen feeder (16); e) an additional gas feeder, wherein said second duct cooperates with said oxygen feeder and said additional gas feed means [col 5, line 63-67, col 6, line 1-6]; f) a flow rate measurement device [see FIG 3, col 4, line 40-45], wherein said flow rate comprises at least one member selected from the group consisting of: 1) said oxygen's flow rate; and 2) said fuel's flow rate; and g) a means for controlling said additional gas's flow rate (35). Due to the spaced apart relationship, there is a premixing of fuels before ignition, thereby providing an additional gas feed means in the broadest sense. It is believed that since there is carbon or soot produced, there is a complement to the oxygen to provide for a more efficient burner means. The additional gas feed means is not limited to a separate supply line/conduit/tube in interpretation. Iatrides further discloses the apparatus having a flow rate control device [col 4, line 28-37]. Iatrides does not further disclose that the flow rate device is slaved as further claimed. Baysinger teaches a similar device wherein flow rate control device adapted to control said additional gas's flow rate, wherein said flow rate control device is slaved to said flow rate measurement device so that a sum of the additional gas, oxygen and fuel flow rates are greater than a preset minimum flow rate DMIN [col 11, line 28-46]. A temperature decrease implies that a flow rate is less than a minimum, and therefore the increase in the conduction of the transistor allows for greater increase in

flow rates above a minimum. In view of Baysinger, there is a flow rate control device slaved so that a minimum flow rate is not maintained but instead increased. It would have been obvious to a person of ordinary skill in the art at the time of the invention to allow a flow rate control device maintain a flow rate above minimum because the technique was known in the art, yielding the predictable result of maintaining a desired temperature and to allow efficient burner operation.

9. With respect to claim 30, latrides discloses the flow rate control device but does not disclose the pressure regulator. Baysinger teaches a similar device wherein the flow rate control device comprises a pressure regulator [col 6, line 41-58]. In view of Baysinger, the pressure is controlled in order to prevent gas build up. It would have been obvious to a person of ordinary skill in the art at the time of the invention to include a pressure regulator because it was known that gas build-up can compromise burner operation, yielding the predictable result of lowering the pressure when needed to allow proper burner efficiency and regulating the pressure is predictable in that the temperature after complete combustion of the products will be in range to produce a suitable flame.

10. With respect to claim 34, latrides discloses the apparatus of claim 30, however does not disclose the flow rate control device as further claimed. Baysinger teaches a similar flow rate controller wherein a technique is used to allow a flow rate of one fluid until a pressure generated by another fluid is sufficient [col 2, line 46-65]. In view of Baysinger the rate of gas flow to the burner is regulated due to the pressure sufficiency of the main gas valve. Therefore, if used to modify latrides, Baysinger would provide a

flow rate control device that allows the feeding of the additional gas until a pressure generated by the additional gas and the oxygen fed to the burner is sufficient to achieve a flow rate of oxidizer greater than $DMIN$, the flow rate of the oxidizer being a sum of the flow rates of the oxygen and the additional gas. The reasoning is because latrides offers a technique of using a flow rate controller as discussed above, and in the same art Baysinger provides another technique to regulate flow. It would have been obvious to a person of ordinary skill in the art at the time of the invention to allow feeding of additional gas until a pressure of other gases are reached because the technique was known, yielding the predictable result of allowing a proper amount of gas pressure without exceeding an unsafe value.

11. With respect to claim 37, latrides discloses the apparatus of claim 28, wherein: said first duct is coaxially located substantially inside of said second duct; and said first duct's end portion is located back from said second duct's end portion [see FIG 1].

12. With respect to claim 38, latrides discloses the apparatus of claim 28, however does not disclose adjust the flow rates above a $DMIN$ value as further claimed. Baysinger teaches a similar device wherein flow rate control device adapted to control said additional gas's flow rate, wherein said flow rate control device is slaved to said flow rate measurement device so that a sum of the additional gas, oxygen and fuel flow rates are greater than a preset minimum flow rate $DMIN$ [col 11, line 28-46]. A temperature decrease implies that a flow rate is less than a minimum, and therefore the increase in the conduction of the transistor allows for greater increase in flow rates above a minimum. In view of Baysinger, there is a flow rate control device slaved so

that a minimum flow rate is not maintained but instead increased. It would have been obvious to a person of ordinary skill in the art at the time of the invention to allow a flow rate control device maintain a flow rate above minimum because the technique was known in the art, yielding the predictable result of maintaining a desired temperature and to allow efficient burner operation.

13. Claims 31, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iatrides ['723], in view of Baysinger ['911], further in view of Versluis [5630408].

14. With respect to claim 31, Iatrides discloses the apparatus of claim 28, wherein there is a flow rate control device, however does not disclose the servovalve as the flow rate control device. Iatrides, however, discloses that any control system can be used to control the flow rate of the additional gas [col 4, line 40-44], therefore it is believed that one of ordinary skill in the art would recognize the different options of controlling the additional gas flow rate to regulate the pressure. Thus, Versluis teaches a similar device wherein the additional gas flow rate is controlled by a servo valve [col 47-54]. In view of Versluis, a servovalve is used to monitor pressure at a burner end. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have the additional gas flow rate controlled by a servovalve because it was recognized that burner pressure must be controlled.

15. With respect to claim 35, Iatrides discloses the apparatus of claim 31, however does not further disclose the servovalve.

16. With respect to claim 36, Iatrides discloses the apparatus of claim 36, however does not disclose calculating the oxygen/fuel stoichiometric ratio.

17. With regards to claims 35 and 36, Iatrides discloses the apparatus, however Versluis discloses the servovalve controls the feeding of the additional gas by slaving an opening of the additional gas feeder to a control value selected from the group consisting of a flow rate of the oxygen and a flow rate of the fuel, the slaving of the opening to the control value taking into account a fixed oxygen/fuel stoichiometric ratio [col 9, line 23-40], and a similar apparatus, wherein the additional gas is air and the slaving of the opening to the control valve takes into account a supply of oxygen from the air in calculating the oxygen/fuel stoichiometric ratio [col 9, line 40-45]. In view of Versluis, the servovalve controls the feeding of the gas and calculates the stoichiometric ratio as further claimed. It would have been obvious to a person of ordinary skill in the art at the time of the invention to use a servovalve because the option was known, yielding the predictable result of controlling the flow of gas based on the amount of another gas present in order to ensure sufficient amounts of gas for combustion, wherein it is then understood that the stoichiometric ratio is accounted for since the air, oxygen and fuel are controlled to a specific amount.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AVINASH SAVANI whose telephone number is (571)270-3762. The examiner can normally be reached on Monday- Friday, alternate Fridays off, 7:30-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven McAllister can be reached on 571-272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Avinash Savani/
Examiner, Art Unit 3749

/Steven B. McAllister/
Supervisory Patent Examiner, Art Unit 3749

/A. S./
6/13/2009